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**Datasheet for the decision
of 04 February 2013**

Case Number: T 1370/09 - 3.5.05

Application Number: 02779840.4

Publication Number: 1444801

IPC: H04L 12/18

Language of the proceedings: EN

Title of invention:

Physically scoped multicast in multi-access networks

Applicant:

Nokia Inc.

Headword:

Multicast routing to proximity devices/NOKIA

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - (yes, after amendments)"

Decisions cited:

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Catchword:

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Case Number: T 1370/09 - 3.5.05

D E C I S I O N
of the Technical Board of Appeal 3.5.05
of 04 February 2013

Appellant: Nokia Inc.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 27 January 2009
refusing European patent application
No. 02779840.4 pursuant to Article 97(2) EPC.

Composition of the Board:

Chair: A. Ritzka
Members: P. Cretaine
D. Prietzel-Funk

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division, posted on 27 January 2009, refusing European patent application No. 02779840.4 on the ground that the claims lacked inventive step (Article 56 EPC), having regard to the disclosure of

D1: D. Meyer, University of Oregon: "Administratively Scoped IP Multicast", RFC 2365, Internet Engineering Task Force, CH, July 1998, pages 1 to 9,

in combination with

D2: T. Imielinski et al., Rutgers University: "GPS-Based Addressing and Routing", RFC 2009, Internet Engineering Task Force, CH, November 1996, pages 1 to 28.

II. Notice of appeal was received on 2 April 2009 and the appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 5 June 2009. The appellant requested that the decision of the examining division be set aside in its entirety and that a patent be granted on the basis of a new main request (claims 1 to 16), a new first auxiliary request (claims 1 to 14) or a new second auxiliary request (claims 1 to 14) filed with the statement setting out the grounds of appeal. In addition, oral proceedings were requested if the board did not allow the main request.

III. A summons to oral proceedings scheduled for 30 January 2013 was issued on 28 September 2012. In an annex to this summons, the board expressed its preliminary opinion on the appeal pursuant to Article 15(1) RPBA. An objection was raised under Articles 52(1) and 56 EPC against the independent claims of the main request, having regard to D1 and D2. At the same time, the board expressed the opinion that the claims according to the first auxiliary request met the requirements of Article 56 EPC. There was therefore no need for the board to examine the claims according to the second auxiliary request and, if the appellant withdrew the main request, the case could be remitted to the department of first instance with the order to grant a patent based on the claims of the first auxiliary request.

IV. With a letter of reply dated 2 January 2013, the appellant withdrew the main request and requested that the application proceed on the basis of the first auxiliary request.

V. In a communication dated 14 January 2013, the board informed the appellant that the oral proceedings had been cancelled.

VI. Independent claim 1 of the first auxiliary request reads as follows:

"1. A method comprising:

(1) receiving information from one or more mobile terminals;

(2) dynamically updating a physical neighbourhood table on the basis of the information received from the one

or more mobile terminals such that the physical neighbourhood table reflects information concerning neighbouring access routers;

(3) receiving a multicast data packet at a first access router;

(4) determining whether the multicast data packet is to be forwarded according to an administratively scoped destination or a physically scoped destination (302);

(5) in response to determining that the multicast data packet is to be forwarded according to an administratively scoped destination (207), forwarding the multicast data packet to an administratively scoped destination (304); and

(6) in response to determining that the multicast data packet is to be forwarded according to a physically scoped destination, consulting the dynamically updated physical neighbourhood table to identify a second access router that is a physical neighbour of the first access router, encapsulating the multicast data packet into a unicast packet (303) and forwarding (306) the unicast data packet to the second access router."

Independent claim 8 of the first auxiliary request relates to an access router configured to perform the steps of claim 1.

Independent claim 14 of the first auxiliary request reads as follows:

"14. An access router configured through a processor and computer-executable instructions:

(1) to receive information from one or more mobile terminals;

(2) to dynamically update a physical neighbourhood table on the basis of the information received from the one or more mobile terminals such that the physical neighbourhood table reflects information concerning neighbouring access routers;

(3) to receive a data packet from one or more mobile terminals;

(4) on the basis of a flag set in the received data packet, to determine whether the received data packet is to be forwarded according to an administratively scoped destination or a physically scoped destination;

(5) in response to determining that the received data packet is to be forwarded according to an administratively scoped destination, to forward the received data packet to an administratively scoped destination; and

(6) in response to determining that the received data packet is to be forwarded according to a physically scoped destination:

(a) to de-encapsulate a multicast data packet from the received data packet;

(b) to transmit the de-encapsulated multicast data packet to devices that are locally connected to the network access device;

(c) to extract and decrement a time-to-live parameter from the received data packet;

(d) in response to determining that the time-to-live parameter exceeds a predetermined threshold, to replicate the received data packet using the decremented time-to-live parameter, to consult the dynamically updated physical neighbourhood table to identify one or more other access routers that are physical neighbours of the access router, and to transmit the replicated data packet containing the

decremented time-to-live parameter to the one or more other access routers."

Reasons for the Decision

1. Admissibility of the appeal

The appeal complies with the provisions of Articles 106 to 108 EPC (cf. point II above) and is therefore admissible.

2. Requests

The requests on file are the first auxiliary request and the second auxiliary request filed with the statement setting out the grounds of appeal.

3. First auxiliary request

3.1 Article 123(2) EPC

The board is satisfied that the amendments to the claims are supported by the application documents as originally filed.

Independent claims 1, 8 and 14 have been amended to specify substantively that information is received from mobile terminals and that a physical neighbourhood table is dynamically updated on the basis of this information, such that this physical neighbourhood table reflects information concerning neighbouring access routers. These features are disclosed in

paragraphs [40], [45], [46], [47] and [50], and in claims 5 and 6 of the published application.

Independent claims 1, 8 and 14 have been further amended to specify substantively that, in response to determining that the multicast packet is to be forwarded according to a physically scoped destination, the physical neighbourhood table is consulted to identify the second access router, which is a physical neighbour of the first access router, to which the unicast packet is to be forwarded. These features are disclosed in particular in paragraphs [38] and [42] of the published application; paragraph [38] describes that the access router AR1 receiving the multicast packet includes a table indicating that access router AR4 is a physically neighbouring access router and paragraph [42] describes that AR1 forwards the received multicast packet, encapsulated in a unicast packet, to AR4.

3.2 Article 56 EPC - inventive step

3.2.1 Prior art

D1 is an IETF Request for Comments which specifies an administratively scoped IP multicast scheme. This scheme is used to confine traffic to a scope region of the multicast address space, the scope region being described by the addresses of the network's nodes therein. D1 describes (see chapter 7) some topological constraints on the regions in respect of their boundaries. Regions must have a compact form such that between any two nodes in a region there must be a path that does not cross the region's boundary. Regions must

have a convex form such that no path between two nodes in a region should cross the regions' boundary. However, a scope region is only defined by the administrative addresses of its nodes, which implies that nodes may belong to different scope regions even if they are geographically close, i.e. neighbouring nodes. D1 therefore only discloses a method for routing multicast packets within the configured administrative boundaries which does not allow multicast packets sent by mobile terminals to travel across two different administrative scope regions.

Document D2 is an IETF Request for Comments which specifies a routing scheme based on geographic addresses, which enables multicasting based on geographical addresses rather than on administrative addresses as in D1, in order to deliver a multicast service to clients who are within a certain geographic range. This is achieved by mapping a set of IP multicast addresses into geographical addresses. Nodes within a specified geographical region at a given time may thus form a multicast group at that time. Location information of each node is provided by the global positioning system (GPS) (see chapter 1). Special-purpose GPS routers installed in base stations of the network are used on top of the current internet to support GPS address routing. Each GPS router is configured to have knowledge of its neighbouring GPS routers at the installation of the system, by using a table containing the IP addresses of at least the router's children and the router's parent (see Figure 1 on page 15). A multicast packet targeting a multicast group is forwarded by a GPS router to the nearest router by using tunnelling: the packet is encapsulated

in an IP unicast message and sent to the IP routers between the two GPS routers (see chapters 3c and 3c-i). Once the packet reaches the second (nearest) GPS router, it is de-encapsulated, examined, and forwarded to the next nearest GPS router, using the tunnelling process, if needed (see chapter 3c-i, last paragraph).

It was common ground during the examination proceedings that D1 relates exclusively to administratively scoped multicast whereas D2 relates exclusively to physically scoped multicast. D1 and D2 could thus be considered equally as closest prior art since the subject-matter of the present application relates to a method and access router adapted to deal with both types of multicast packets. The originally filed description however acknowledged D1 as being one of the conventional multicasting schemes, based on administrative scoping rules, which do not enable multicasting to geographically close network devices, as opposed to the scheme of the present application. Therefore the board concurs with the examining division and the appellant in considering D1 as the best starting point for examining the issue of inventive step.

3.2.2 The differences between the subject-matter of claim 1 and the disclosure of D1 are thus that the claimed method comprises:

- receiving information from mobile terminals and dynamically updating a physical neighbourhood table on the basis of this information, so that this physical neighbourhood table reflects information concerning neighbouring access routers,

- determining whether the received multicast packet is to be forwarded either to an administratively scoped destination or a physically scoped destination, and
- in response to determining that the destination is physically scoped:
 - consulting the physical neighbourhood table to identify a second access router that is a physical neighbour of the first access router,
 - encapsulating the multicast,
 - forwarding the unicast packet to the second access router.

The technical effects of these differences are that a network access router is able to identify a second kind of multicast packets, having a physically scoped instead of an administratively scoped destination, and to route a physically scoped multicast packet to a physical neighbour access router, this router being identified in a table updated in the router itself and not pre-programmed at the installation of the network system.

The objective technical problem is regarded as how to improve the flexibility of the network with respect to the definition of multicast groups without substantial modification of the structure of the access router network.

The skilled person, looking for a solution to said problem, may well consider combining the teaching of D2 with the disclosure of D1 since D2 also relates to multicasting in an IP network. The skilled person would try to implement the physically scoped multicasting of D2 in a network already using the administratively scoped multicasting of D1 in order to improve the flexibility of the overall multicasting scheme. For implementing the scheme of D2 in a network according to D1, the skilled person would have to implement functionalities of the GPS routers of D2, with respect to the encapsulation of received physically scoped multicast messages in a unicast message and the sending of the unicast message to a physical neighbour of the receiving access router. The skilled person would choose to implement these functionalities in the existing routers of D1 as a matter of normal design procedure, the determination of the type of the received multicast packet by the routers being then a direct consequence of this implementation.

However, if the skilled person were to combine the teachings of D1 and D2 in this way, it would also implement the functionalities of the GPS routers of D2 in respect of the identification of physically neighbouring routers. D2 teaches (see in particular paragraphs 3a-i, 3c-i, 3c-iii and 3c-iv) that each router is provided at the time of its installation in the network with a table containing the IP addresses of the router's children and parent in a hierarchical geographical arrangement of routers (see Figure 1 at page 15). The skilled person would thus not arrive at a method as claimed, wherein the table indicating the neighbouring routers is not predefined at the

installation of the routers but is instead dynamically updated on the basis of information received from mobile terminals. This feature enables use to be made of the standard behaviour of any mobile terminal which, during hand-off, provides information about the access router of the area it is leaving to the access router of the area it is moving into, the two access routers being by definition physical neighbours. By incorporating this feature, the claimed method does not necessitate the loading in each router of a physical neighbourhood table during installation of the network and allows a more flexible network design than the hierarchical geographical positioning of the routers disclosed in D2.

There is no suggestion in D2 or D1 that would direct the skilled person to incorporate this feature into a system based on the combination of D1 and D2. Therefore the board judges that the subject-matter of claim 1 involves an inventive step (Article 56 EPC), having regard to the disclosure of D1 and D2.

Independent claim 8 relates to an access router for performing the method of claim 1 and as such also meets the requirements of Article 56 EPC. Independent claim 14 defines an access router adapted for receiving and forwarding a packet having an administratively scoped multicast destination or a packet having a physically scoped multicast destination and having been previously encapsulated. In the latter case, the packet is routed to a neighbour router identified in a physical neighbouring table as defined in method claim 1. Thus, the board judges that the subject-matter

of independent claim 14 meets the requirements of Article 56 EPC.

Claims 2 to 7 and 9 to 13 are dependent claims and as such also fulfil the requirements of Article 56 EPC.

4. Second auxiliary request

Since the board judges that the first auxiliary request is allowable, it does not need to consider the second auxiliary request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of:
 - claims 1 to 14, submitted as first auxiliary request on 5 June 2009;
 - description:
pages 1 to 3 as filed in electronic form on 6 November 2007,
pages 4 to 16 as originally filed;
 - drawings sheets 1/9 to 9/9 as originally filed.

The Registrar

The Chair

K. Götz

A. Ritzka